Chikungunya Virus – An Emerging Threat to the Americas

Clinician Outreach and Communication Activity (COCA) Conference Call

February 18, 2014

Office of Public Health Preparedness and Response
Division of Emergency Operations

Objectives

At the conclusion of this session, the participant will be able to accomplish the following:

- **Describe which patients to test for the infection**
- **Explain testing, treatment and prevention measures for chikungunya**
- **Understand the importance of early recognition and reporting of cases**

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TODAY'S PRESENTER

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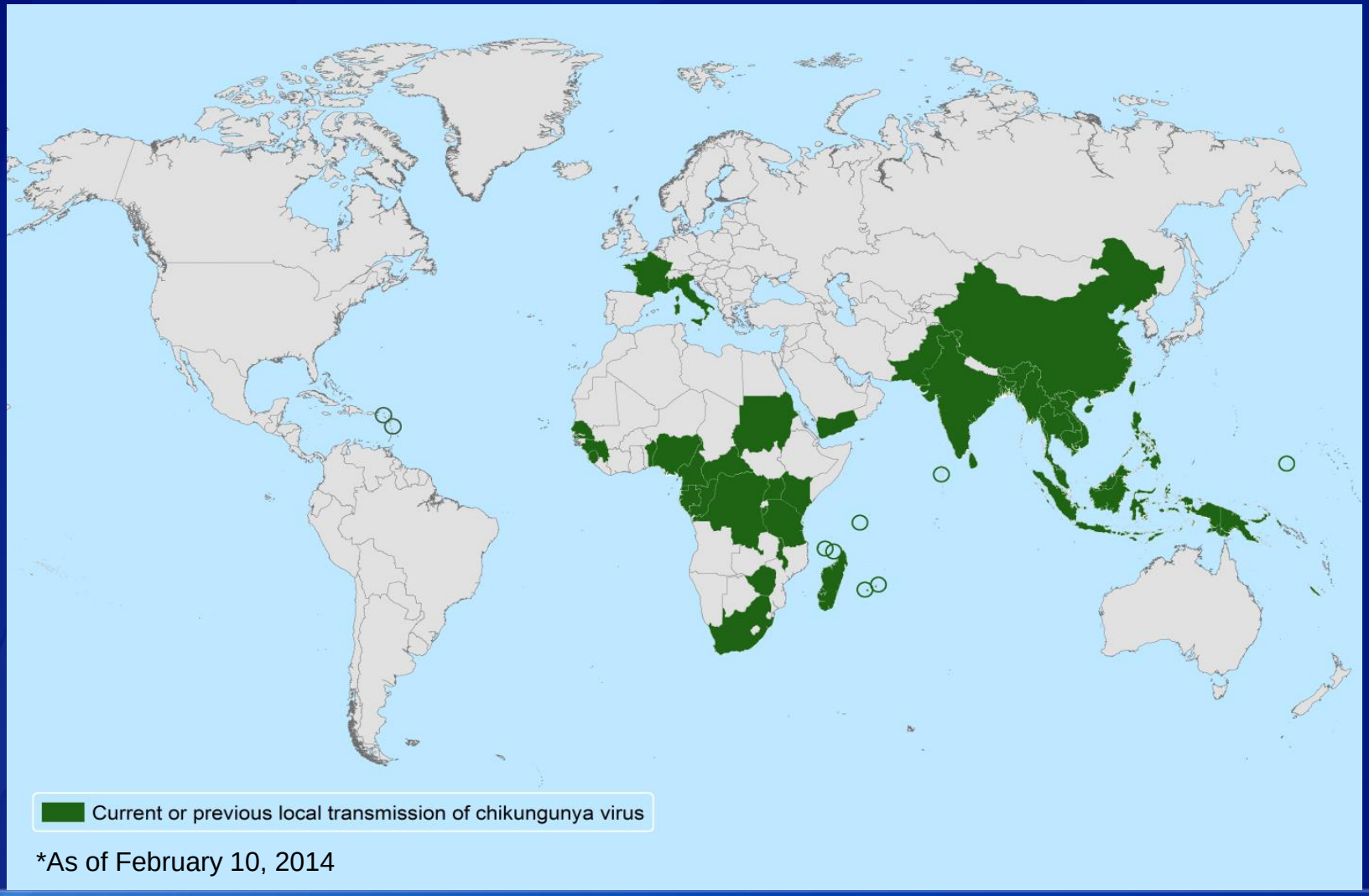
Chikungunya virus disease

- Mosquito-borne viral disease characterized by acute onset of fever and severe polyarthralgia
- Often occurs in large outbreaks with high attack rates
- Outbreaks have occurred in countries in Africa, Asia, Europe, and the Indian and Pacific Oceans
- In 2013, first locally-acquired cases in the Americas reported on islands in the Caribbean

Countries with reported local transmission of chikungunya virus*



*As of February 10, 2014

Chikungunya virus in the Americas*

- Seven Caribbean countries have reported locally-acquired cases
- >1,000 laboratory-confirmed cases have been reported
- Virus expected to spread to new areas

*As of February 10, 2014

Chikungunya virus in the United States

- Chikungunya virus is not currently found in U.S.
- From 2006-2009, 106 laboratory-confirmed chikungunya cases identified in travelers visiting or returning to U.S.
  - None triggered a local outbreak in U.S.
- With outbreaks in Caribbean, number of chikungunya cases among U.S. travelers will likely increase
- Imported cases may result in virus introduction and local spread in some areas of U.S.

Chikungunya virus

- Single-stranded RNA virus
- Genus *Alphavirus*
- Family *Togaviridae*
- Closely related to Mayaro, O'nyong-nyong, and Ross River viruses

Mosquito vectors

- Predominantly *Aedes aegypti* and *Aedes albopictus*
- Same mosquitoes that transmit dengue
- Widely distributed throughout Americas
- Aggressive daytime biters

Aedes aegypti

Aedes albopictus

Primary transmission cycle

Anthroponotic transmission
(person to mosquito to person)

Other modes of transmission

- Documented rarely
  - *In utero* transmission resulting in abortion
  - Intrapartum from viremic mother to child
  - Percutaneous needle stick
  - Laboratory exposure
- Theoretical concern
  - Blood transfusion
  - Organ or tissue transplantation
- No evidence of virus in breast milk

Chikungunya virus infection

- Majority (72%–97%) of infected people develop clinical symptoms
- Incubation period usually 3–7 days (range 1–12 days)
- Primary clinical symptoms are fever and polyarthralgia

Fever and polyarthralgia

- Fever
  - Abrupt onset
  - Typically ≥39.0°C (≥102.2°F)
- Joint pain
  - Often severe and debilitating
  - Involves multiple joints
  - Usually bilateral and symmetric
  - Most common in hands and feet

Other clinical signs and symptoms

- Headache
- Myalgia
- Arthritis
- Conjunctivitis
- Nausea/vomiting
- Maculopapular rash

Clinical laboratory findings

- Lymphopenia
- Thrombocytopenia
- Elevated creatinine
- Elevated hepatic transaminases

Atypical disease manifestations

- Uveitis
- Retinitis
- Hepatitis
- Nephritis
- Myocarditis
- Hemorrhage
- Myelitis
- Cranial nerve palsies
- Guillain-Barre syndrome
- Meningoencephalitis
- Bullous skin lesions*

*Primarily described in neonates

Risk factors for hospitalization or atypical disease

- Neonates exposed intrapartum
- Older age (e.g., >65 years)
- Underlying medical conditions (e.g., diabetes, hypertension, or cardiovascular disease)

Clinical outcomes

- Acute symptoms typically resolve in 7–10 days
- Mortality is rare; occurs mostly in older adults
- Some patients have relapse of rheumatologic symptoms* in the months following acute illness
- Studies report variable proportions of patients with persistent joint pains for months or years

*Polyarthralgia, polyarthritis, tenosynovitis, Raynaud's syndrome

Diagnostic testing

- Culture for virus*
- Reverse transcriptase-polymerase chain reaction (RT-PCR) for viral RNA
- Serology for IgM and confirmatory neutralizing antibodies
- Serology for ≥4-fold rise in virus-specific quantitative antibody titers on paired sera†

*Virus should be handled under biosafety level (BSL) 3 conditions
†Determined by plaque reduction neutralization test (PRNT) or immunofluorescence assay (IFA)

Optimal timing for diagnostic assays

Diagnostic assay	Days post-illness onset
Viral culture	≤3 days
RT-PCR	≤8 days
IgM antibody tests	≥4 days

Laboratories for diagnostic testing*

- Testing performed at:
  - CDC Arboviral Diseases Branch
  - Several state health departments†
  - One commercial laboratory (Focus Diagnostics)‡
- Contact your state health department for information or to facilitate testing

*As of February 2014
† California, Florida, and New York
‡Testing may be ordered through other commercial laboratories and will be forwarded to Focus Diagnostics for testing

Treatment

- No specific antiviral therapy
- Supportive care with rest and fluids
- Non-steroidal anti-inflammatory drugs (NSAIDs) for acute fever and pain*
- Persistent joint pain may benefit from use of NSAIDs, corticosteroids, or physiotherapy

*Aspirin use is discouraged due to a theoretical risk of hemorrhage or Reye syndrome

Distinguishing dengue from chikungunya

- Viruses transmitted by same mosquitoes
- Diseases have similar clinical features
- Viruses can circulate in same areas and cause co-infections
- Important to rule out dengue, as proper clinical management can improve outcome*

*WHO dengue clinical management guidelines: http://whqlibdoc.who.int/publications/2009/9789241547871_eng.pdf

Clinical features of chikungunya virus infections compared with dengue virus infections

	Chikungunya	Dengue
Fever (>39°C)	+++	++
Arthralgia	+++	+/-
Arthritis	+	-
Headache	++	++
Rash	++	+
Myalgia	+	++
Hemorrhage	+/-	++
Shock	-	+

Laboratory features of chikungunya virus infections compared with dengue virus infections

	Chikungunya	Dengue
Lymphopenia	+++	++
Neutropenia	+	+++
Thrombocytopenia	+	+++
Hemoconcentration	-	++

Differential diagnosis for chikungunya

- Dengue
- Leptospirosis
- Malaria
- Rickettsia
- Parvovirus
- Enterovirus
- Group A streptococcus
- Rubella
- Measles
- Adenovirus
- Post-infectious arthritis
- Rheumatologic conditions
- Other alphavirus infections (e.g., Mayaro, Ross River, Barmah Forest, O'nyong-nyong, and Sindbis viruses)

Surveillance

- Inform travelers going to areas with known virus transmission about risk of disease
- Consider chikungunya in patients with acute onset of fever and polyarthralgia
- Be aware of possible local transmission in areas where *Aedes* species mosquitoes are active

Reporting of chikungunya cases

- Suspected cases should be reported to state or local health departments to
  - Facilitate diagnosis
  - Mitigate risk of local transmission
- State health departments encouraged to report laboratory-confirmed cases to CDC

Preventive measures

- No vaccine or medication available to prevent infection or disease
- Primary prevention measure is to reduce mosquito exposure
- Advise persons at risk for severe disease to avoid travel to areas with ongoing outbreaks
- Protect infected people from further mosquito exposure during first week of illness

Mosquito prevention and control

- Use air conditioning or window/door screens
- Use mosquito repellents on exposed skin
- Wear long-sleeved shirts and long pants
- Empty standing water from outdoor containers
- Support local vector control programs

Selected references

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Additional resources

- General information about chikungunya virus and disease: http://www.cdc.gov/chikungunya/
- Protection against mosquitoes: http://wwwnc.cdc.gov/travel/yellowbook/2014/chapter-2-the-pre-travel-consultation/protection-against-mosquitoes-ticks-and-other-insects-and-arthropods
- Travel notices: http://wwwnc.cdc.gov/travel/notices
- Information for travelers and travel health providers: http://wwwnc.cdc.gov/travel/yellowbook/2014/chapter-3-infectious-diseases-related-to-travel/chikungunya
- Chikungunya preparedness and response guidelines: http://new.paho.org/hq/index.php?option=com_docman&task=doc_download&gid=16984&Itemid

Questions

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To Ask a Question

- **Using the Webinar System**
  - “Click” the Q&A tab at the top left of the webinar tool bar
  - “Click” in the white space
  - “Type” your question
  - “Click” ask

- **On the Phone**
  - Press Star (*) 1 to enter in the queue to ask a question
  - State your name
  - Listen for the operator to call your name
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Centers for Disease Control and Prevention
Atlanta, Georgia

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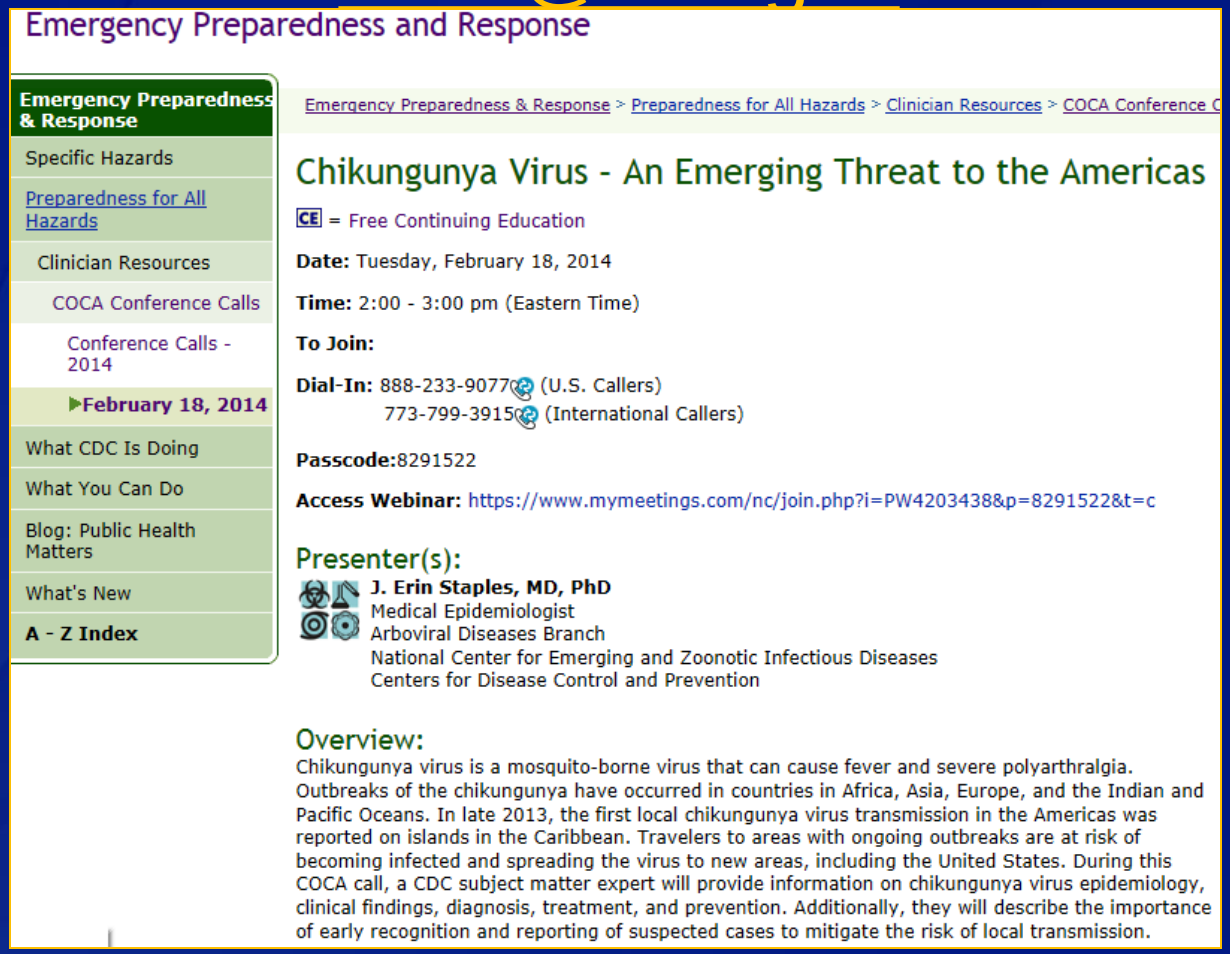

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CE = Free Continuing Education

Date: Tuesday, February 18, 2014

Time: 2:00 - 3:00 pm (Eastern Time)

To Join:

Dial-In: 888-233-9077 (U.S. Callers)
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Passcode:8291522

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Presenter(s):

J. Erin Staples, MD, PhD
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Centers for Disease Control and Prevention

Overview:

Chikungunya virus is a mosquito-borne virus that can cause fever and severe polyarthralgia. Outbreaks of the chikungunya have occurred in countries in Africa, Asia, Europe, and the Indian and Pacific Oceans. In late 2013, the first local chikungunya virus transmission in the Americas was reported on islands in the Caribbean. Travelers to areas with ongoing outbreaks are at risk of becoming infected and spreading the virus to new areas, including the United States. During this COCA call, a CDC subject matter expert will provide information on chikungunya virus epidemiology, clinical findings, diagnosis, treatment, and prevention. Additionally, they will describe the importance of early recognition and reporting of suspected cases to mitigate the risk of local transmission.

http://emergency.cdc.gov/coca

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